Research Underway: Bangarang

Data Entry Program ~ Users' Manual

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INTRODUCTION

RU Bangarang (RUB) is a data entry program designed specifically for my dissertation work in the northern Great Bear Fjordland. It is designed to be an easily viewed, intuitive, button-based way of entering observations while letting the computer take care of associating each entry with the necessary but intensive logistical data (time, gps coordinates, current conditions, observers on board, effort status, etc.). The forms are designed to be navigated by using the mouse, using the tab key, or using the touch screen. It is also designed to output these data in a single file that can serve as both a raw record of the day's work and a single source from which to draw certain types of data (e.g. locations of hydrophone recordings and the locations of sighted whales). These, at least, were my intentions.

The program was written in Visual Basic 2010 Express and published as a stand-alone executable file (.exe) for Windows. The program outputs text files to a folder it creates on the C directory of your computer. In addition to making this program available to others, I have provided the project files for the program, as well as my R scripts for analyzing the output text files, on my website. They could be tailored to specific research needs, or provide examples to those who start from scratch. A warning: I am by no means a programmer and the scripts are scrappy to say the least! Do not expect eloquent or efficient code.

WHERE TO DOWNLOAD

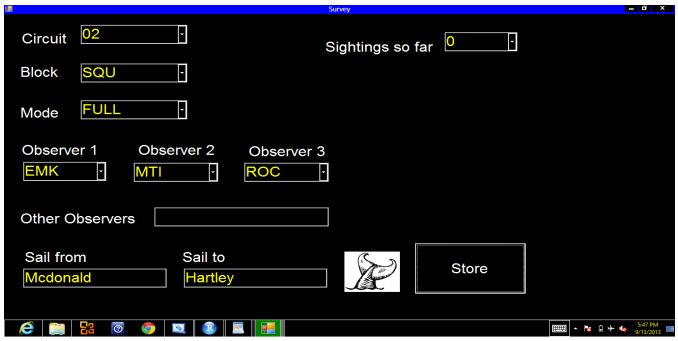
RUB can be used only on Windows platforms (XP, 7, or 8) that have the free VB.NET framework installed. The program can be downloaded for free, either as a stand-alone .exe or as a Visual Basic project able to be edited. It can be accessed here on Eric's website. Navigate to Research > Dissertation Work > Reports & Software.

GETTING STARTED

When the program starts up, the user is presented with a start-up window whose Visual Basic code contains most of the running mechanics of the program (saving master variables and updating the GPS location). This window can be minimized, but it cannot be closed. It will only be closed when the Home Screen is closed and the user confirms that she is sure she wants to quit.

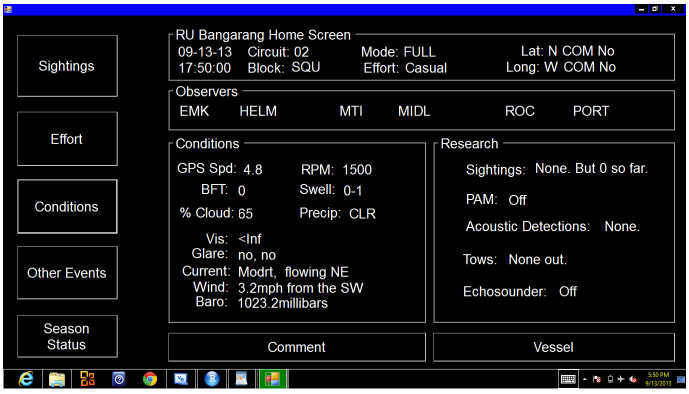
(Note the high-contrast display used, for viewing outdoors. This is a property of the laptop and not the program.)

The user is then asked to enter basic survey information about the day (see SUR info below for details).



The Home Screen

The user interacts with RUB starting at the Home Screen. This screen both displays the status of all ongoing research efforts and provides menus for entering new observations.



Exiting

To exit RUB, you must close the Home Screen. A dialog box will appear making sure you wish to quit. If you did not mean to quit, press No and nothing will close. If you press Yes, a dialog box will appear telling you the filename in which the session's data has been stored. The program will then close.

The "Back" Button

Almost every form in RUB displays the Bangarang whale-tail icon shown above. Clicking this icon will close the current form without saving any information to the text file and return you to the home screen.

OUTPUT: Overview

RU Bangarang (RUB) saves logged data into a single .txt file in a dedicated folder on the C drive: "C:/Bangarang". Text files are cross-platform, open-source, and highly stable. They can be read-in as .csv's in R. The text file output also provides a raw, unfiltered narrative of the day's research effort. A downside is that it is barely legible to the untrained eye. However, the text file can then be fed to an R script that breaks the single file into highly organized dataframes -- WITHOUT risking the corruption of the original data.

Every line in the output text file corresponds to a certain event. For instance, all the information given during a seabird sighting is reported as a single line in the output. In each line, the data is comma-separated into columns. Each line, regardless of event, follows the same format for the first many columns. Almost all entries will have the following packages of data for each line, to make post-processing easier:

Format of a typical output line:
Event Code, Date, Time, GPS, Event Prefix, Master Conditions, Observers, Subevent Code, Event Details

Many of these packages comprise several columns. Most "standard output entries follow the following column index:

1. Event
2. Date
3. Time
4. Latitude
5. Longitude

6-11. Prefix
- 6. Effort
- 7. PAM Status
- 8. Echosounder Status
- 9. Circuit
- 10. Block
- 11. Survey Mode

12-27. Conditions:
- 12. Beaufort sea state
- 13. Swell height (m)
- 14. Percent cloud cover
- 15. Visibility
- 16. Precipitation status
- 17. Glare - left bearing
- 18. Glare - right bearing
- 19. Current strength
- 20. Curren direction (setting ...)
- 21. Vessel GPS speed
- 22. Vessel Heading
- 23. Vessel speed over water
- 24. Wind speed (Averaged, mph)
- 25. Wind direction (out of the...)
- 26. Air temperature
- 27. Barometer

28-33. Observers:
- 28. Observer 1
- 29. Observer 1 position (helm, midship, bow port, bow starboard)
- 30. Observer 2
- 31. Observer 2 position
- 32. Observer 3
- 33. Observer 3 position

OUTPUT: Standard Fields

1. EVENT CODE:
A three-character acronym that describes the event being reported (see Output Index below). For instance, an output line describing a SIghting of a seaBird begins with the event code SIB.

Event (Col. 1)	Subevent (Where applicable)		Description
Logistics			
NEW			New Output file
SUR			Survey status
SEA			Conditions
COM			Comment
REV			Comment, flagging output for revision
ENG			Engine status report
END			End of output file
Effort			
EFF			Effort
OBS			Update on Observer Positions
ECO	BEG		Echosounder: Begin recording
ECO	END		Echosounder: End recording
PAM	BEG		Passive acoustics: Begin recordings
PAM	STP		Passive acoustics: End recording.
PAM	NEW		Passive acoustics: New detection.
PAM	UPD		Passive acoustics: Update on detection.
PAM	END		Passive acoustics: End of detection.
Stations			
CTD			CTD cast
ZOO			Zooplankton tow
SEK			Secchi disk cast
DEB			Debris sighting
Sightings			
BAB	GEN		Bait Ball encounter: general info.
BAB	PRY		Bait Ball encounter: prey data
YUM			Salmon sighting
VES			Vessel sighting
SIB			Bird sighting
SIM			Marine Mammal sighting
SIW	NEW		Whale sighting, new
SIW	UPD		Whale sighting ,update
SIW	END		Whale sighting, end
ENC			Encounter between vessel and whale
WIW	POS		With Whales: position update
WIW	IMG		With Whales: Image and ID data
WIW	COM		With Whales: comment
WIW	BHV	BTH	With Whales: behavior: breath
WIW	BHV	MIS	With whales: behavior: missed breath
WIW	BHV	FLK	With whales: behavior: fluke
WIW	BHV	OTH	With whales: behavior: other behavior

2. DATE is given in the format yyymmdd

3. TIME is Pacific Daylight Time taken from the computer system time, given in the format hhmmss.

4-5. GPS Coordinates are given in the format, e.g., "5326543, 12912897". This format is an expedient way to enter GPS data manually if the antenna fails. I have written functions in R that translate this string of numbers into a format that can be mapped in the R package PBSmapping (from the DFO Pacific Biological Station). In certain events, the GPS stamp in this first section of output corresponds to only the beginning of the event. If the GPS readings begin misbehaving, there is a GPS Repair button on the Other Events form that usually fixes the problem.

6-11. EVENT PREFIX:
This section of the output line consists of multiple columns:
6. Effort status:
    0=Off Effort
    1=On Transect
    2= Point Count (no longer used)
    3= At station
    4 = With Whales
    5 = Casual Effort
7. PAM Recording status (1 for recording, 0 for not recording)
8. Echosounder status (1 for recording, 0 for not recording)
9. Study circuit
10. Block
    CAM = Caamano Sound
    CMP = Campania Sound
    EST = Estevan Sound
    SQS = Squally South
    SQN = Squally North
    WHA = Whale Channel
    WRI = Wright Sound
    MCK = McKay Reach / South Ursula
    VER = Verney Passage / North Ursula
11. Mode (Full, Lite, or Zero)

12-27. MASTER CONDITIONS:
Beaufort, Swell height, % Cloud cover, Visibility, Precipitation, Glare bearing left, glare bearing right, water current strength, current direction (flowing to the...), GPS speed (knots), vessel heading, engine RPM, wind average speed (mph), wind direction (coming out of the...), air temperature (Celsius), barometric pressure (kPa).

28-33. OBSERVERS:
Observers reported as their 3 initials.
Positions are 4-letter descriptors:

HELM	The data entry / navigation position at the helm.
MIDL	The midships position.
PORT	The bow position, looking on the port side of the vessel.
STAR	The bow position, looking on the starboard side of the vessel.

34 onward. Event Details

OUTPUT: Event Details

Following these standard data, the output line then provides event-specific data at the end of the line. These Event Details are formatted uniquely for each event. Some events are more information-rich than others (e.g. whale sightings), while some are straightforward (e.g. position and effort updates). Below I outline the output

of each event code and the mechanics of the associated form(s) for logging it.

Logistics Events

NEW New RUB Session has begun.
This line is output automatically at the opening of the RUB program. No prefix, conditions, or observers are reported here.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6. filepath

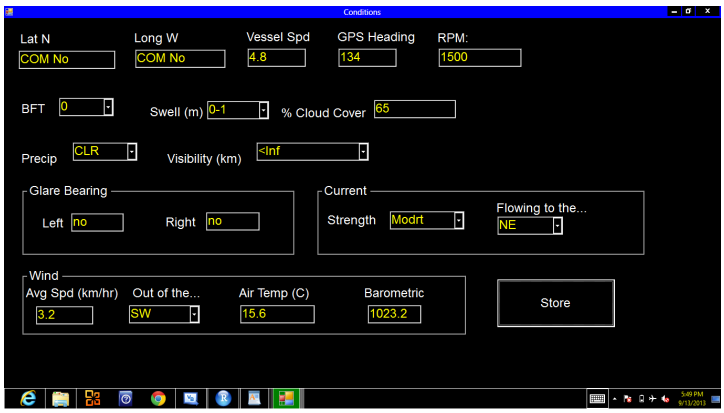
SUR Survey Status

Access:
This form automatically pops up at the opening of the program. It can also be accessed from the home screen.

See figure of form in "Getting Started". The default observers are changed according to who is on board at the time. "EMK" is always a default observer. This current version of RUB does not save the survey status info from the previously opened session. Most of the details in this event are saved publicly and displayed in the outputs of other forms. All Season Status data are displayed on the Home Page. The observers selected here determine which observer initials are available in the "Observed By" fields of the sightings forms.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Other observers
35. Sail from
36. Sail to

SEA Sea State and Sighting Conditions

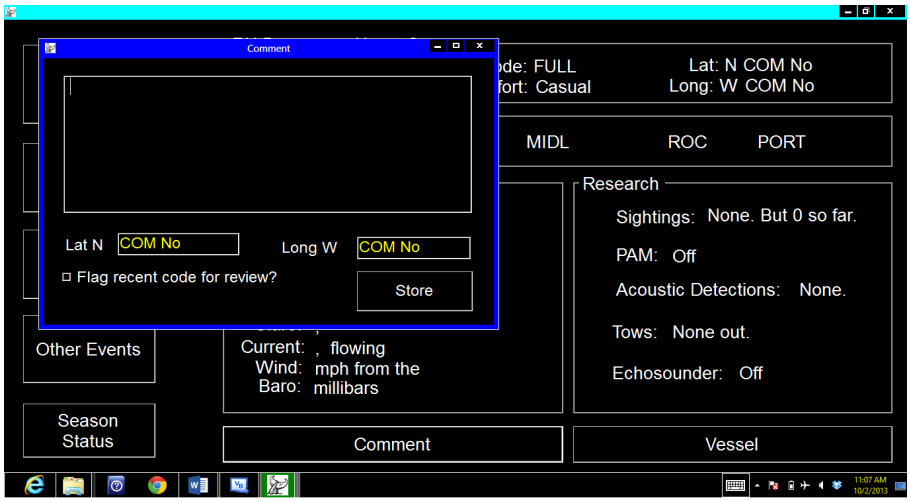


Access:
Home Screen > Conditions.
(You can also double click on the top left of the Conditions status screen on the Home Screen.)

The data filled out in this form are displayed in the updated Master Conditions string. See the section regarding it above for units and an index of columns.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers

COM Comment



Access:
Home Screen > Comment.
Sightings Main > Comment.
(There are also shortcuts to the comment form on various sightings forms).

COM is just a non-revisionary comment entry. The comment string is unlimited length. The Comment window is not maximized, so that windows underneath can be referenced for the comment. Some forms have a column entry of their own, which is appended to the end of their line. In later versions, the comment system in this program may be streamlined.

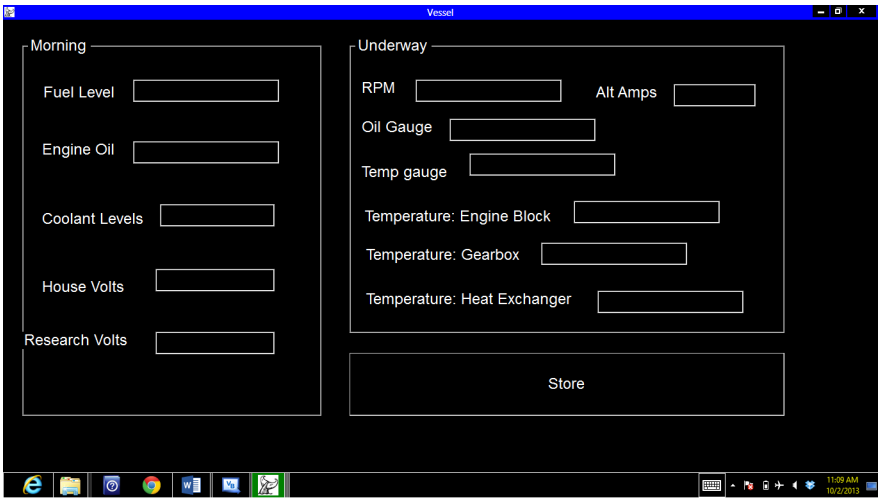
Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers

34. Comment

REV Revise recent code

REV flags the code for review and editing by the PI later. This output is achieved by checking the checkbox underneath the comment box that reads "Flag recent code for review?" It has the same column names as COM.

ENG Engine status and performance



Access:
Home Screen > Vessel

Report fuel levels, operating temperature, and other maintenance-related conditions of the engine. This form is purely for the record keeping of the skipper.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Engine oil level
35. Coolant level
36. Fuel level
37. House volts
38. RPM
39. Oil gauge
40. Temp gauge
41. Block temperature (measured using infrared thermometer)
42. Gearbox temperature
43. Heat exchanger temperature

END End of RU: Bangarang session.

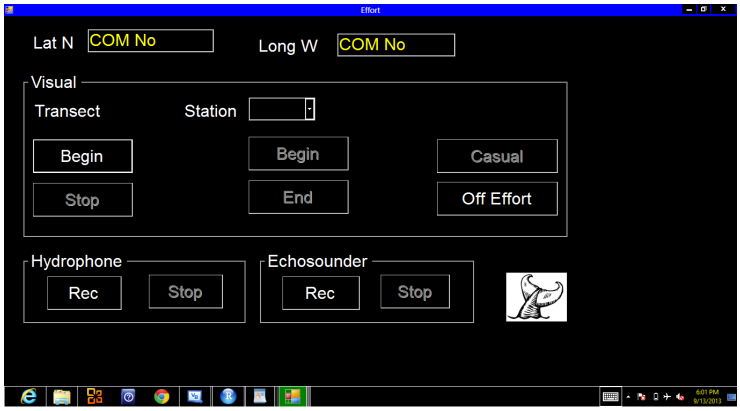
This line is output automatically at the shutdown of the program.

Columns:

1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6. Filepath
7. Total number of sightings for RUB session: to this will make it easy to total the season sighting number.

Effort Events

EFF Change of Effort



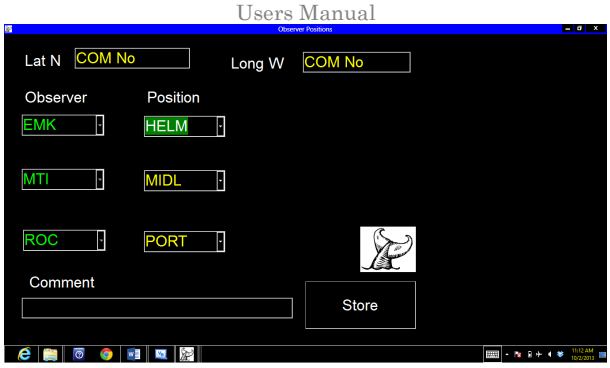
Access:
Home Screen > Effort

This effort code is saved to a public variable each time it is updated. Most other forms save the current values for these effort variables (visual, passive acoustic, and active acoustic) in their outputs. The effort form disables and enables buttons according to what the current effort is. For example, if the effort variable is currently "1", meaning On Transect, the button to begin a transect is disabled. This helps the user avoid mistakes. In the above figure, effort is currently at Casual, and there are no acoustic recordings going on.

To Begin at a station, you must first select the station number. The “Begin” button will then become enabled. When the program begins, the default effort status is Casual ("5"). Effort status is displayed on the Home Page.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix

OBS Update Observer Positions

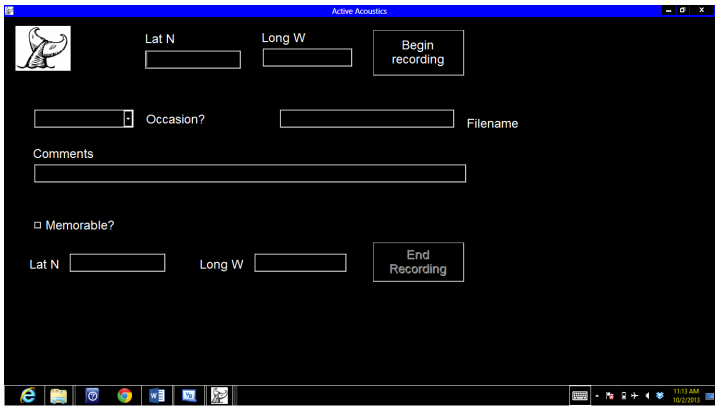


Access:
Home Screen > Other Events > Observer Positions
(You can also double click the left of the observers status bar on the Home Screen.)

The observers on offer here are determined by what is entered into the SURvey form. Here you can only change their positions.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers

ECO BEG, END Echosounder Recording, Begin and End



Access:
Home Screen > Effort (allows you to quickly denote the beginning and end of recording. This does NOT end the recording! You must do that manually on the echosounder computer. This only notes that it has ended.)

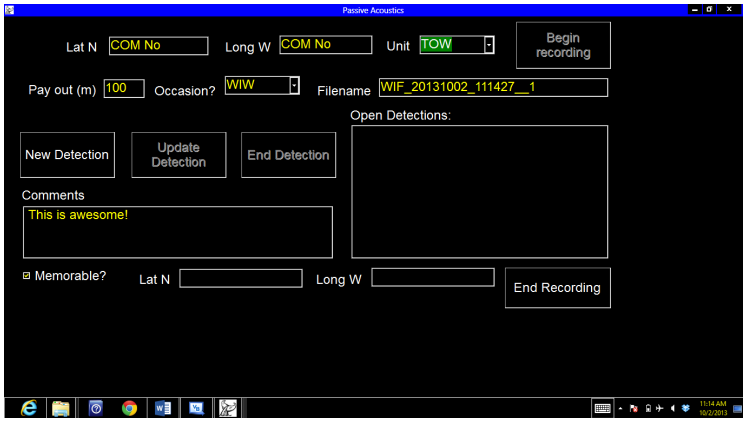
Home Screen > Other Events > Active Acoustics (allows you to input more information and update an ongoing recording. This screen can be modified then closed and the modifications will be saved; however if the Back button is used, modifications will not be saved).

Columns:
1. Event
2. Date
3. Time

4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Subevent
35. Filename: Filename is currently coded as yyyyMMdd_hhmmsstt_# of the day (2 characters, if less than 10 recordings, the first character is an underscore). For example: 20130603_093212pm_1. The file extension for Syqwest Hydrobox echosounder output is .odc.

36. Occasion: Occasion codes (3-character strings) are similar to those in CTD:
    TRN = Along transect
    STA = station
    POI = point count
    WIW = with whales
    DVM = daily vertical migration
    ADH = Ad hoc / impromptu / unplanned
37. A blank column (previously Station number).
38. Memorable? (Boolean, TRUE is yes it is memorable, FALSE if not).
38. Comment (unlimited length).

PAM BEG, STP, NEW, UPD, END Passive Acoustic Monitoring recording.



Subevents:
BEG: Denotes the beginning of a recording.
STP: Denotes the end of a recording.
NEW: A new acoustic detection during a recording.
UPD: An update of a previously detected noise.
END: And of an acoustic detection.

Access:
Home Screen > Effort (allows you to quickly denote the beginning and end of recording. This does NOT end the recording! You must do that manually on the echosounder computer. This only notes that it has ended.)

Home Screen > Other Events > Passive Acoustics (allows you to input more information and update an ongoing recording.) Note that there is no back button on this page. To get away from the page without storing changes, the form must be X'd out on the top right of the screen.

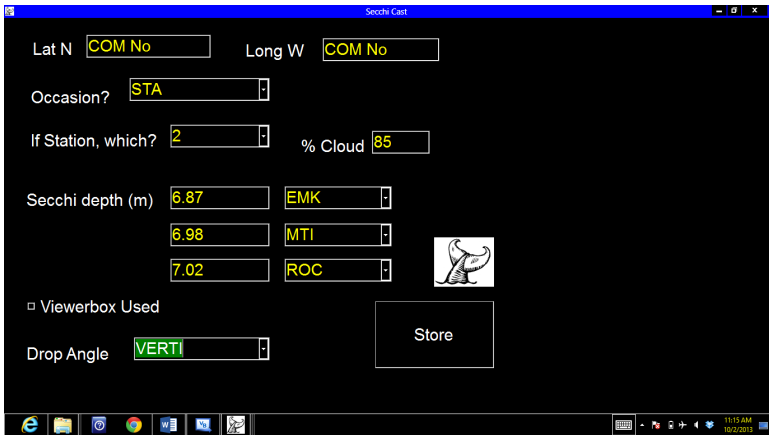
Once a recording is logged as having begun, acoustic detections can be logged, updated, and ended. The "Open Detections" box lists any ongoing detections. Users can select a detection from this box and update or end it. Only 5 detections can be open at a time.

Columns:

1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Subevent
35. Filename: formatted automatically as it will likely appear in the output from Raven on the PAM Mac.
36. Unit: which hydrophone is used. Default is the TOWed array.
37. Payout: Default payout is the full length of the Bangarang array, 100m.
38. Memorable? (Boolean, TRUE means the recording is memorable and FALSE means it is not. Default is FALSE.)
39. Comment (unlimited string length).
40. Detection number (tally kept automatically by computer).
41. Spp (See abbreviations index).
42. Behavior (See abbreviations index).
43. Signal-to-noise ratio (0 silent to 5 distorted)
44. Vessel noise (0 silent to 5 distorted)
45. Background noise (0 silence to 5 loud)

Station Events

SEK **Secchi Cast**

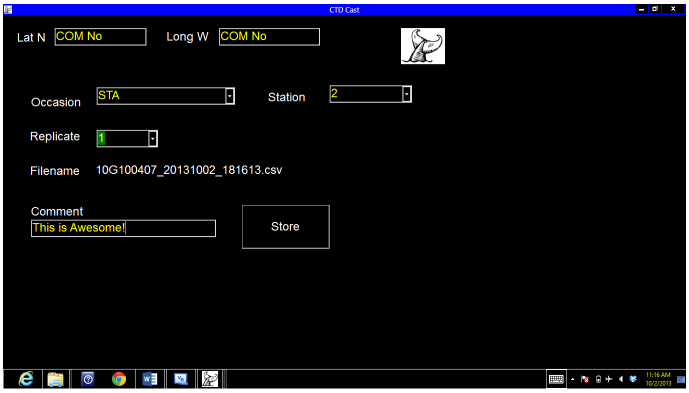


Access:
Home Screen > Other Events > Secchi Cast

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Viewbox used Viewbox (Boolean; TRUE if used, FALSE if not used)
35. Occasion (see CTD output)
36. Station: If your effort has already been changed to At Station, the station number will automatically be filled in on this form.
37. %Cloud cover

38. Angle
39. Observer 1 (filled in automatically from what was entered in the SURvey page. Same for other obs.)
40. Observer 1 depth (m)
41. Observer 2
42. Observer 2 depth
43. Observer 3
44. Observer 3 depth

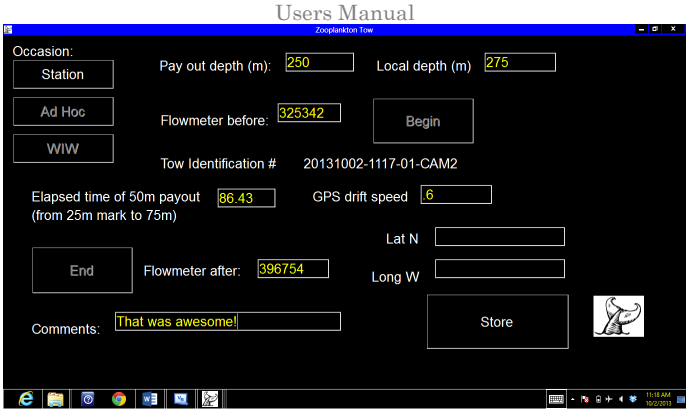
CTD **A CTD cast.**



Access:
Home Screen > Other Events > CTD

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Occasion:
    STA = Station - at a Study Station within a block
    DVM = Dawn and evening diel vertical migration observations
    HOC = Ad Hoc = unplanned, conducted due to interesting features encountered or just plain feel like it.
    POI = Point Count = Conducted during a point count for birds
    OTH = Other - conducted for some other reason
    WIW = With Whales - conducted because we are doing a focal follow of whales
35. Station number
36. Replicate: refers to the first, second, or third cast at that site, in case there are several. The default entry is 1.
37. CastAway filename: Using the system time, the probably filename of the CTD cast is recorded in the same format as it will be save in the CTD itself. This will aid in matching casts to the RUB output.
38. Comments (on surface features, debris, eddies, observed water column characteristics, etc).

ZOO **A zooplankton tow**



Access:
Home Screen > Other Events > CTD

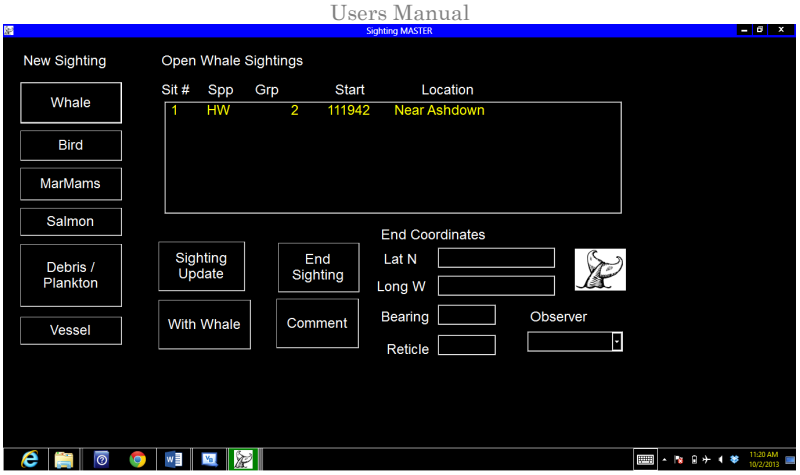
The buttons are programmed to be enabled and disabled only when the critical information has been entered. For example, you can press the "BEGIN" tow button unless the flowmeter number has been entered first. Correspondingly, you can't store the code unless the flowmeter number has been stored afterward.

Because tows usually happen in succession (i.e., along block transects or when With Whales), the values from the last-entered tow during the program's session are displayed when a new Tow form is opened. The values, however, are still editable.

Columns:
1. Event
2. Date
3. Time (this is when the tow began)
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Occasion (automatically supplied if effort is already At Station.
35. Tow Identification Number (TIN)
    Format (without spaces in reality): yyyyMMddhhmmtt CIRCUIT BLOCK Station Code
    For example:In Caamano Sound South on Circuit 2, on June 22 at 08:43am, at station 02, the TIN will be: 201306220843am1CSS02
36. Flowmeter begin (6 digits)
37. Flowmeter end (6 digits)
38. End timestamp
39. End Latitude (should be automatically logged by the software, unless the GPS has failed.)
40. End Longitude (should be automatically logged.)
41. Payout (m):
    The default pay out depth is 250m (the total length of the zooplankton line), but it can (and SHOULD!) be changed according to local depth.
41. Local depth (m)
42. Comment

Sightings Events

To enter a sighting, go to the “Sightings” button on the Home Screen. You will be brought to this new window:



Buttons on the left allow you to enter specific types of sightings. The central window displays any whale sightings that are still open. A maximum of 5 can be open at any one time. A dialog box will alert you when sightings must be closed in order to enter a new one.

DEB Debris or Plankton Sighting

Access: Home Screen > Sightings > Debris/Plankton

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Type
35. Extent
36. In strip (Boolean, TRUE if clearly in the strip; FALSE if not. Default is TRUE.)
37. …But on the Line (Boolean, TRUE if on the line of the strip; FALSE if not. Default is FALSE.)
38. Birds associating/rafting? (Boolean, TRUE if birds are associating with the debris; FALSE if not. Default is FALSE.)

YUM Salmon Sighting

Access: Home Screen > Sightings > Salmon

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers (determined by what has been entered in SURvey form).
34. Jumps
35. Within Strip (Boolean, TRUE if clearly within the strip width; FALSE if not. Default is TRUE.)
36. …But on the line (Boolean, TRUE if on the line of the strip; FALSE if not. Default is FALSE.)
37. Observer
38. Comment

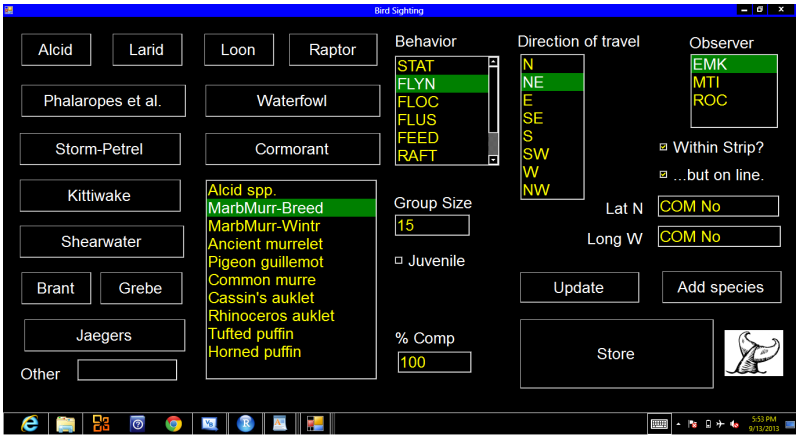
VES Vessel Sighting

Access: Home Screen > Sightings > Vessel

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Bearing (maximum length is 3 characters)

35. Reticle (maximum length is 3 characters)
36. Observer (options determined by what has been entered in SURvey form).
37. Blank column (previously Position)
38. Vessel type
39. Name
40. Company
41. Direction of travel
42. Comment

SIB Seabird Sighting



Access: Home Screen > Sightings > Bird

This form is designed for rapid entry of a large amount of observations. When the page opens, the box listing possible species seen is blank. Click on one of the seabird group buttons, and the box fills with possible species within that group. The appropriate species is then selected and other information is filled in.

If more than one species is seen in the group, you can add species to the sighting; upon clicking "Add Species", the species listbox will empty and you must press another Taxon button to select from its species list. A maximum of 5 species can be included in a single sighting. After the fifth species is added, the "Add Species" button is disabled.

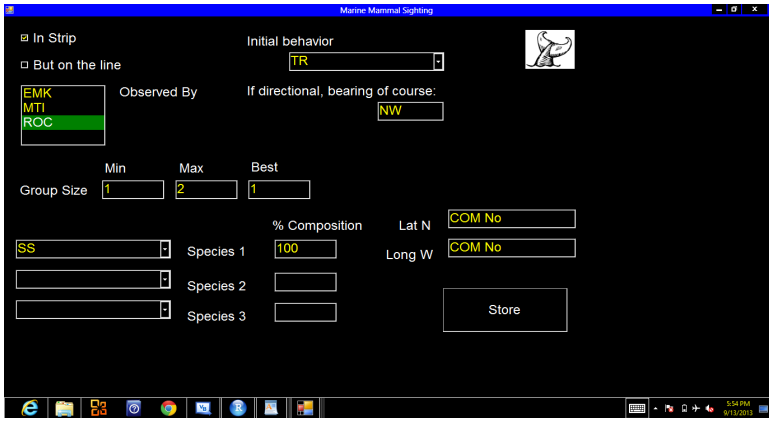
Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. In Strip? (Boolean, TRUE if clearly in the strip; FALSE if not. Default is TRUE.)
35. …But on the Line.
36. Group size
37. Behavior

    Codes (4-character strings):
    STAT - stationary/swimming
    FLYN - in flight
    FLOC - flocking

FLUS - flushed by our vessel
FEED - foraging/feeding
RAFT - rafting on debris
BALL - bait ball bonanza
FOLO - following our vessel

38. Species 1
39. Species 1 percent composition of overall group size (default is 100)
40. Species 2 (if present)
41. Species 2 percent composition
42. Species 3 (if present)
43. Species 3 perc. comp.
44. Species 4 (if present)
45. Species 4 perc. comp.
46. Species 5 (if present)
47. Species 5 perc. comp.
48. Direction of travel
49. Observer (options determined by what has been entered in SURvey form).Observer position
50. Time of position update
51. GPS of position update
52. Juvenile? (Boolean; TRUE if yes the bird added is a juvenile).

SIM Marine Mammal (non-whale) Sighting

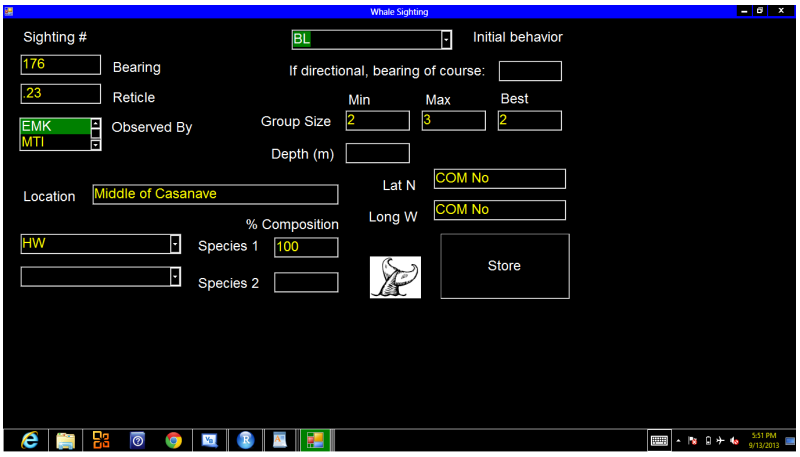


Access: Home Screen > Sightings > MarMam

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Bearing (maximum length is 3 characters)
35. Reticle (maximum length is 3 characters)
36. Observer (options determined by what has been entered in SURvey form).
37. Behavior
38. Direction
39. Group size – minimum estimate
40. Group size – maximum estimate
41. Group size – best guess

42. Species 1 (see Abbreviation index).
43. Spp1 percent comp (default is 100)
44. Spp2
45. Spp2 percent comp
46. Spp3
47. Spp3 percent comp

SIW NEW & UPD Whale Sighting: New or Update



Access: Home Screen > Sightings > Whale

To update a sighting, select the open sighting on the main Sightings page, and click the "Update" button below.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Sighting number
35. Subevent (NEW, UPD)
36. Bearing (maximum length is 3 characters)
37. Reticle (maximum length is 3 characters)
38. Observer (options determined by what has been entered in SURvey form).
39. Blank (previously Position)
40. Group size - minimum
41. Group size - maximum
42. Group size - best
43. Species 1 (see abbreviation list)
44. Percent composition of total group size (default is 100)
45. Species 2
46. Percent composition

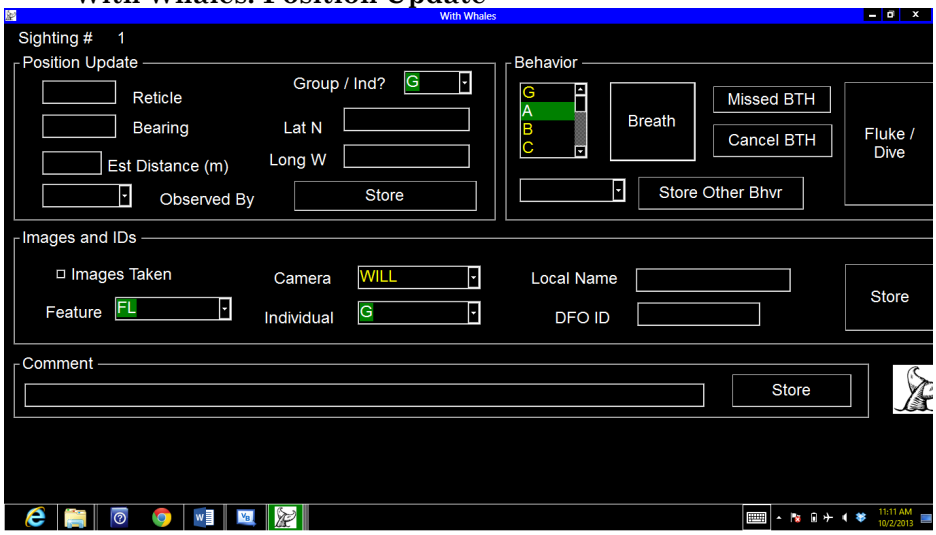
47. Behavior (see abbreviation list; default is BL, blow).
48. Direction of travel
49. Depth
50. General location

SIW END End a Whale Sighting

A sighting is ended by selecting it on the Main Sightings page, filling in the lat/long and observer information on the bottom right of the form, and clicking the "End Sighting" button. If your effort is "With Whales" (4) when you end a sighting, your effort automatically defaults to "Casual" (5).

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Sighting Number
35. Bearing
36. Reticle
37. Observer (options determined by what has been entered in SURvey form).
38. Position

WIW POS With Whales: Position Update



Access: Home Screen > Sightings > (Select Sighting) > With Whales button

When the "With Whales" form is opened, the effort is changed automatically to "4", or "With Whales". When the form is closed, however, effort is not changed. You must manually go to the effort page and change effort. However, if your effort is With Whales and you end a sighting – ANY sighting – your effort defaults to Casual (5). So, if you are with a whale and you leave the With Whales form to end a distant sighting, effort will be momentarily switched to casual until you re-open the With Whales form.

Columns:
1. Event

2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Sighting number
35. Subevent
36. Subsubevent (blank in this case)
37. Bearing (maximum length is 3 characters)
38. Reticle (maximum length is 3 characters)
39. Observer (options determined by what has been entered in SURvey form).
40. Estimated distance (a convenient replacement to reticles when you are close to the whale).
41. Group/Individual

This allows you to differentiate between following the group and following an individual within the group. If you are following an individual, arbitrarily assign it a letter (e.g., "A"), and make a comment about why this individual is trackable and distinguishable from the others.)

WIW IMG With Whales: A good photo-ID image is taken.

This entry is a convenient way of matching photographs to sightings when processing images in PhotoMechanic at the end of a day. It is especially convenient if you are tracking certain individuals in a group worth making notes on (e.g. mothers and calves).

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Sighting number
35. Subevent
36. Subsubevent (blank in this case)
37. Images Taken (True or False)
38. Feature (FL, RD, LF, Other)
39. Camera
40. Group/Individual designation
41. DFO ID (if recognized)
42. Local name (if known)

WIW COM Comment logged while with a whale

There is a convenient comment field on the With Whales page. The second you store a comment, the field clears and is ready to accept the next comment.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude

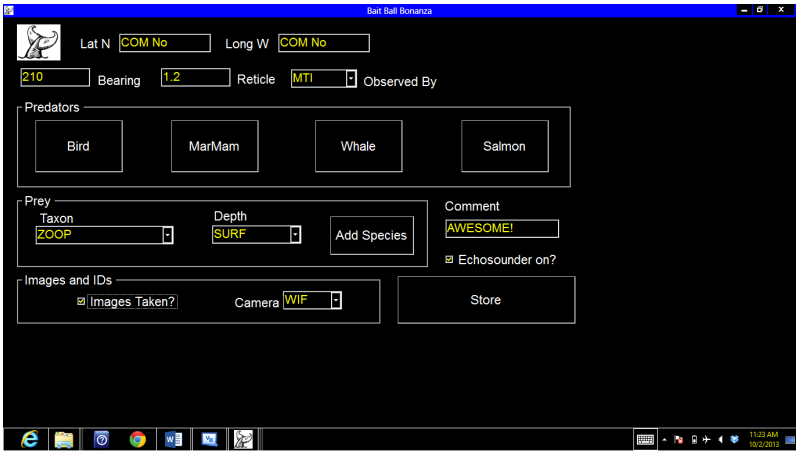
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Sighting number
35. Subevent
36. Subsubevent (blank in this case)
37. Comment

WIW BHV BTH/MIS/CAN/OTH With Whales: Behavior: Breath subsubevents

Subevent Key:
BTH: Log a breath of an individual or group. At the click of this button, timestamps and gpsstamps are given to the breath for the designated individual in the group.
MIS: Log that a breath was missed, so that not all is lost in breath interval analyses down the road.
CAN: Log that a breath was mistakenly logged; it will be canceled later on.
OTH: Log a behavior other than breaths. See Abbreviation appendix.

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Sighting number
35. Subevent
36. Subsubevent
37. Group/Individual
38. "Other" Behavior

BAB GEN, PRY Bait Ball: General Entry or Prey Entry



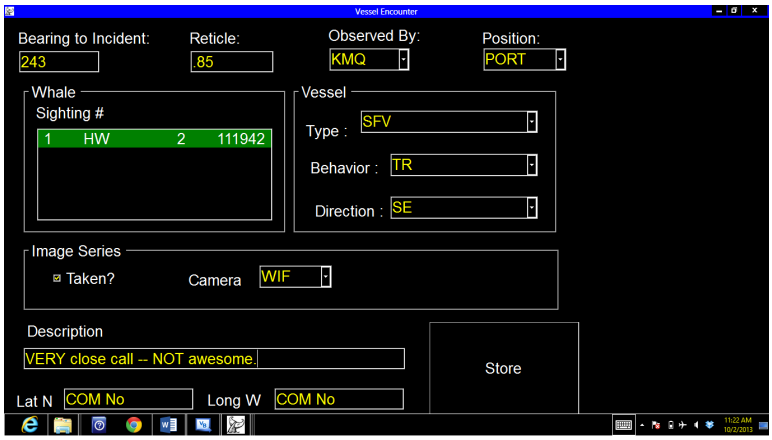
Access: Home Screen > Other Events > Bait Ball

This form was designed to be a quick and easy way of entering spastic data during a baitball encounter. Clicking on the Predator buttons will open the appropriate sighting page without closing the BaitBall form.

Columns:

1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33 . Observers
34. Subevent: GEN or PREY
35. Gen: Bearing; Pry: prey
36. Gen: Reticle; Pry: depth
37. Observer (options determined by what has been entered in SURvey form).
38. Blank column (Previously Position)
39. Camera used, if any.
40. Images Taken (Boolean; TRUE if images were taken; FALSE if not. Default is FALSE.)
41. Echosounder (Boolean; TRUE if the echosounder is recording during the encounter; FALSE if not. Default is FALSE.)
42. Timestamp of when form is stored and baitball is left.

ENC Encounter between Vessel and Whale



Access: Home Screen > Other Events > Vessel Encounter

Columns:
1. Event
2. Date
3. Time
4. Latitude
5. Longitude
6-11. Prefix
12-27. Conditions
28-33. Observers
34. Sighting number
35. Bearing (maximum length is 3 characters)
36. Reticle (maximum length is 3 characters)
37. Observer (options determined by what has been entered in SURvey form).
38. Vessel type
39. Behavior of Vessel
40. Direction of travel
41. Images taken? (true or false)
42. Camera used

43. Description (unlimited string length)

APPENDIX 1: EXAMPLE OUTPUT

Below is an example of every possible output in the program.

```
NEW, 20130921, 225452,                                                
```

APPENDIX 2: RUB Abbreviations Index

Block
CAM Caamano Sound
CMP Campania Sound
EST Estevan Sound
SQS Squally Channel South
SQN Squally Channel North
WHA Whale Channel
WRI Wright Sound
VER Verney Passage and north Ursula
MCK McKay Reach and south Ursula

Occasion
STA Station
WIW With Whales
HOC Ad Hoc (unplanned)
OTH Other

Image Feature (FTR):
FL Fluke
LD Left Dorsal
RD Right Dorsal
OT Other

Species

Whales
HW Humpback
FW Fin
KW Killer
BW Baleen (generic)

Small Marine Mammals (MarMams)
DP Dalls Porpoise
PW Pacific White-sided Dolphin
SS Stellar's Sea Lion
CS California Sea Lion
HS Harbor Seal
ES Northern Elephant Seal
SO Sea Otter (!)
RO River Otter

Vessel Types
SAL Sailing vessel
REC Recreational/sports fishing vessel
YAT Yacht / pleasure cruiser
CFV Commercial Fishing Vessel / Seiner
GIT Gitga'at boat
CRZ Cruise ship
TKR Tanker
BRG Barge and tug
Tug Tug

Vessel Company
WCR West Coast Resorts
NKL North King Lodge
HNJ Hermann and Janie
GIT Gitga'at Spirit/Guardian
OTH Other

Behavior

With Whales
MIL Milling
SLP Sleeping
BCH Breach
PEC Pectoral Slap
FAC Face Slap
TAL Tail Slap
TON Tonal Blow
SPY Spy Hop
FED Deep Foraging Dive
FEL Lunge Feed at surface
FEB Bubble Net Feed
TRN Traveling North
TRE TR- East
TRS TR- South
TRW TR- West

Marine Mammsls
BL Blow
MI Milling
FE Feeding
SL Sleeping
HO Hauled Out
BR Breach
PS Pec Slap
OT Other

Vessels
TR Traveling
FI Fishing
AN Anchor
WW With Whales
OT Other

Birds
STAT Stationary
FLYN Flying
FLOC Flocking
FLUS Flushed
FEED Feeding
RAFT Rafting on debris
BALL Bait Ball
FOLO Following a boat.

Acoustic
MOAN Moan
WSTL Whistle
FEED Feeding call
TBLO Tonal blow
SOCL Social call
ECHO Echolocation click
SONG Song
OTHR Other